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(Mr. Follett)

MEDICAL STATISTICS

OF THE

UNITED STATES FRIGATE POTOMAC,

COMMODORE JOHN DOWNES, COMMANDER,

DURING A THREE YEARS' VOYAGE CIRCUMNAVIGATING THE GLOBE.

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THE United States Frigate Potomac, 44, bearing the pennant of Commodore John Downes, with a complement of five hundred men, performed a voyage of circumnavigation of the globe, during a cruise of three years. During this period she traversed ninety-seven degrees of latitude, that is, from 40° N. to 57° S., crossing the equator six times. A period of nearly two years was passed between the tropics; and it may be here added, as not a little singular, that while three months were spent within 6° of the equator in the East Indies, where a malignant dysentery made its appearance on board, the same period, subsequently, was passed in the same latitudes at the direct antipodes, in the vicinity of the Gallapagos Islands, where, from the absence, no doubt, of marshes, rank vegetation, and consequently of malaria, (notwithstanding these causes are not considered by many essential to the production of malarial diseases,) the crew enjoyed the average health of our own latitudes.

A concise statistical account of the health of the crew, with a brief notice of the character of the diseases developed in the different climates traversed, as well as those resulting from the confinement of so large a body of men on board ship, may not be uninteresting to the profession, as well as to the general inquirer. These, together with some brief observations upon the medical topography of the most important ports visited, are here presented from our notes and journal made during three years of active service and privations at sea, in the hope that they may prove interesting to some comfortably-seated fireside-traveller at home.

In entering upon the details of this voyage, we would bespeak the patient indulgence of the reader, confident that the general deductions, at least, will be interesting to the physician, the philanthropist, and the political economist.

We reported for duty on board the Potomac on the 22d of May, 1831, at which time two hundred and fourteen of her crew were on board. On the day of joining, twenty-four were upon the sick report, consisting of slight cases of indisposition usually encountered among new recruits. On the 3d of June, the ship hauled off from the navy-yard at Washington, to Greenleaf Point, (a distance of two miles,) into deep water; and here her armament and stores were received on board. Throughout the day the crew, exposed to a very hot sun, labored hard and drank freely of the river water alongside. During the night and the following day, many, in consequence, doubtless, to a great extent, of the impurities of the water drunk, were seized with cholera morbus, accompanied with violent spasms, which, in several robust young men, required copious venesection; but the disease readily yielded to treatment. As the ship was immediately after watered and no more cases occurred, its relation with the river-water seems the more obvious. The sick list was increased from twenty-two to thirty-six in one day, in consequence, no doubt, of this indulgence in the use of the river-water.

On the 15th of June we left Washington for Hampton Roads, where we arrived on the 22d. The change from a fresh water river to the waters of the bay, materially improved the health of the crew, several cases of vernal intermittents having been speedily cured. The sick list, for the number of men on board, continued large, having a daily average of twenty-three during the twenty-four days that we remained at Norfolk; and this high ratio was kept up by the new drafts of men, who came on board after the most violent debauchery and dissipation. A very valuable seaman, who had been appointed boatswain, visited the shore on the 4th of July, to congratulate himself upon the receipt of his warrant; and after three days' absence, he was brought on board laboring under mania a potu and haemoptysis, which proved fatal on the third day after his return.

On July 16th, we sailed for New York, with three hundred and fifty of the crew on board; and in five days we anchored off the battery, in the harbor of that city. The full complement of the officers and crew having been here made up, and all the supplies furnished, the Potomac sailed, on the 24th of August, 1831, with five hundred and two souls on board. All were in apparent good health, excepting one officer, affected with tracheal phthisis, whose case will be noticed in the sequel. The average age of the crew, as near as could be ascertained, was thirty-one years.

In our passage toward the equator, we did not encounter the north-east trade winds, those of a variable kind and light airs having prevailed until we reached the third degree of north latitude; and here we met the south-east trades, which continued, with uniform regularity and force, until our arrival at Rio de Janeiro. After passing the Cape de Verd islands, our course for eight days was parallel with the coast of Africa, distant four hundred miles; and here we encountered the most violent rains, accompanied with thunder and lightning, a high temperature, and thick, sultry, disagreeable weather. Several cases of remitting fever presented themselves in these latitudes, but they did not assume a violent form. On the 6th of October we crossed the equator; the thermometer was 79° , with fresh trade winds, and cloudy weather; and twenty-eight were on the sick report. The passage from New York to Rio was made in fifty-three days; and during this time, the mean

elevation of the thermometer at noon was 76° . Twelve cases of fever occurred, and ten were treated for injuries. Of the younger part of the crew, who had not been to sea previously, many suffered much from the confinement on board ship and the change of diet; and several obstinate cases of sea-sickness continued throughout the passage.

During our stay of twenty days in the harbor of Rio, the crew were freely supplied with fresh provisions, and were permitted to indulge without restraint in the delicious tropical fruits, which were very abundant. The mean of the thermometer at noon was 76° , that of the barometer 29.70 in., and the daily proportion on the sick report was seventeen.

The harbor of Rio is in $22^{\circ}30'$ south latitude, just within the tropic of Capricorn. It is equally unrivalled for its extent, its numerous deep bays, and its incomparable scenery; and notwithstanding its intertropical location, it is exempt from malignant diseases, the yellow fever being there unknown. It also escaped the ravages of that dreadful scourge, the cholera epidemica. The inhabitants, however, far from enjoying vigorous health, are of a bilious temperament, feeble, and short-lived. Cutaneous diseases prevail to a great extent, and the streets are crowded with beggars suffering from leprosy and elephantiasis. Ships of war that remain a long period in this port usually have large sick lists, consisting, in a majority of cases, of diseases of the alimentary canal. Chronic diarrhoea is here very insidious in its invasion, and often terminates in incurable ulcerations. The rainy season is the most healthy, but ships' crews cannot be too carefully sheltered by awnings from the sun and rain; and they should carefully abstain from the unripe fruit, which is brought off in great quantities by the bomb-boats.

Having sailed on the 5th of November for the Cape of Good Hope, we anchored in Table Bay on the 6th of December, after a passage of thirty-one days. The passage was boisterous, with much rain and thick foggy weather; the easting was made between the 32° and 34° of south latitude, strong westerly winds prevailing; and the thermometer averaged near 60° at noon throughout the passage. Forty were admitted with dysentery and diarrhoea on the passage; and of these most occurred immediately after leaving port, and required treatment until our arrival at the Cape. The average number on the sick report during the passage, was twenty-one. The cold and wet weather induced a return of intermittent fever in twelve, who had had previous attacks; but the disease readily yielded, after our reaching Table Bay, where intermittents are of rare occurrence.

The mean annual temperature at the Cape of Good Hope is about 68° , and the climate appears to be very favorable to health, in both natives and foreigners. Instances of longevity are numerous in the various races of men met with here, among whom are the Caffres, Hottentots, African Dutch-boors, and the English residents. The bills of mortality exhibit all the variety of disease to be met with in the same latitude north, while the violent and fatal diseases of warm climates are unknown. Invalids from British India often resort to this place for the restoration of health, many of whom, as we were informed, derive much benefit from the change.

In 1833, according to the British army statistics, the deaths were only six hundred and eighty-one out of a population of thirty-one thousand one hundred and sixty-seven, being one in forty-six, while in England,

according to the last census, the proportion was one in forty-seven and one-half. When it is considered that among the deaths at Cape Town, many were invalids who arrived there in the last stage of disease, and moreover that in some of the neighboring districts, the mortality for 1833 was only one in sixty-seven, which is a lower ratio than in the healthiest counties of England, it is obvious that, so far as regards the resident population, the climate is certainly not less favorable to the constitution than that of Britain. Among the British troops serving here, nearly two-thirds of the admissions into hospital are of that description which seldom prove fatal. Of the more serious diseases, the following is the order of their prevalence:—those of the stomach and bowels, those of the lungs, fevers, rheumatic affections. Intermittent and remittent fevers are extremely rare, they being, it is said, entirely unknown among the native inhabitants. In pulmonary affections, the climate is regarded as decidedly favorable.

Southeast winds prevail here, and frequently blow with great violence; and when this occurs, they are accompanied with a remarkable phenomenon, viz.: a small stationary cloud, which hangs over Table Bay, in the midst of the most violent tempest. Table Mountain and the white sandy beach of the bay, form the section of an amphitheatre, upon which an African sun glows with intense ardor; and from this heated surface, a highly rarified air ascends, until it attains the elevation of Table Mountain, when it comes in contact with the south-east winds, surcharged with humidity in their long passage over the Indian Ocean; and as the dew-point is thus suddenly reached, the cloud in question is formed; but, as it gradually attains the temperature of the surrounding atmosphere, the humidity is again absorbed, so that there is a constant generation and destruction, in the midst of a tempest, of this remarkable stationary cloud. While the Potomac remained, the mean temperature at noon was 78° .

On the 12th of December we sailed from Table Bay. Immediately after doubling the Cape we encountered a violent gale from the west; and a rough sea, and cold, wet weather, with westerly winds, continued until we made the island of St. Paul's. Several cases of pleuritis occurred, and many suffered from catarrh and rheumatism up to this period.

From the Island of St. Paul's, our course was northeast to Quallah-Battoo on the west coast of Sumatra, where this ship had been ordered to redress a piracy and murder, committed upon the ship Friendship of Boston. The crew were formed into division, and exercised whenever the weather would permit, in the use of fire-arms and the cutlass, to prepare them for the landing among these piratical and treacherous Malays; and such was the excitement upon the subject, and the anxiety of all to participate in the affair, that the sick report was smaller during the passage of fifty-one days, than at any other period of the cruise. The daily proportion sick was ten; and upon our arrival at Quallah-Battoo, but three were unable to attend to duty, out of a crew of more than five hundred. The equator was crossed on the 27th of January, the thermometer being at 76° , with steady fresh south-east trade-winds; and on the 5th of February, we anchored off Quallah-Battoo.

On the morning of the 6th, the attack was made upon the town, dismantling and destroying three forts, by which we had eleven wounded and two killed. In one of the wounded, the ball traversed

the right lung, entering on the right of the sternum, at the sixth rib, and passed out under the scapula, having carried with it pieces of his belt, cloth jacket, and shirt. The haemorrhage from the lungs was relieved by copious venesection on the spot where he fell. He continued to improve slowly; and after the foreign substances mentioned above were discharged by means of an abscess in the right side, he recovered with a collapse of the lung. Nearly all the wounds were severe, and several were dangerous; but from the comfortable quarters on the gun-deck of the frigate, and the uniform temperature of the atmosphere, they all recovered with unusual rapidity. We remained twelve days, during which time the thermometer stood at 85° , at meridian of each day, with alternate land and sea breezes. The severe exertions of the crew at the time of the attack on shore, and the necessary subsequent labor and exposure in watering the ship, after a long period of light duty, produced a material change in the health of the crew; and this was promoted by the absence of excitement which had for a time prevailed among all, and perhaps also by causes of a climatic nature. The sick list of three, in one month, increased to fifty-seven. Fifty-two cases of disease of the bowels and twelve of bilious fever, were treated within the month, notwithstanding fresh meat and vegetables were daily served to all hands, and every precaution was used to protect the men from the sun.

We have here a confirmation of an extraordinary fact, recorded in the "Statistical Report on the Sickness and Mortality of the Army of the United States," embracing the period from 1819 to 1839:—

"It is, indeed, a remarkable fact in the medical history of fleets and armies, that, during the active progress of warlike operations, troops are little subject to the influence of disease. It seems as though the excitement of the passions has the power of steeling the system against the agency of morbid causes. On the contrary, as soon as the excitement is withdrawn, by a cessation of operations and a return to the monotony of a garrison, the constitution manifests the consequences of recent fatigue and exposure."

The Malays in this vicinity, which is in 4° north latitude, are healthy and robust, compared with their Asiatic and Javanese neighbors. They are very temperate in their habits, use but little animal food, and, like all Mahomedans, bathe frequently. Our numerous merchant vessels which have for years visited this coast, engaged in the pepper trade, enjoy comparative health, and apprehend but little danger when on the coast of Sumatra; while the shores of Java and Borneo, on the contrary, are shunned as we do a pest-house.

The topographical configuration of the west coast of Sumatra will readily account for its salubrity. Bold hills and spurs of mountains extend down to the sea; and although nature here revels in perpetual verdure, and there is a constant decay of vegetable matter, yet there are no fens and marshes, the mountain streams being precipitated with rapidity to the sea. Mount Ophir of Solomon is directly inland from this port, being distinctly visible whenever the atmosphere is free from clouds. We met with many of the natives who had suffered recently from small pox; and goitre was very common among them,—a disease which here at least cannot be attributed to snow-water as the exciting cause, for snow never falls even upon the mountains. On the 16th of February, we sailed from the west coast of Sumatra, and crossed the

equator on the 20th, with the thermometer at 85°. On the 25th, the sick list was again reduced to thirty, no new cases of diarrhœa having been admitted since leaving port; and the wounded were all doing well.

On the 28th, we anchored in Bantam Bay, on the northwestern extremity of Java, just within the Straits of Sunda. A change was here made in the ration by order of Commodore Downes, which contributed materially to the preservation of the health of the ship's company. Portions of the beef, pork, and beans, which constitute the navy ration, were discontinued, and rice and curry served out in lieu of them. The spirit ration was divided into three portions, one of which was given in the morning, one at noon, and the other in the evening. All hands were ordered to wear flannel; and they were daily inspected at quarters by the officers, to see that the order was complied with. At Bantam Bay, we remained twelve days, wooding and watering ship; and during this period, the mean temperature at noon was 82°, with the regular land and sea-breezes, and several showers every day. Fifteen cases of dysentery and four cases of fever, were admitted upon the report, with a daily average of twenty-nine sick during our stay.

On the 19th of March, we arrived at Batavia; and with a hope to preserve the crew in good health, we anchored four miles from the shore. This port has been more fatal to navigators than any other on the globe. The largest and most valuable Indiamen have often here been laid up for want of hands to navigate them, and here entire ships' crews have found their graves. It was in this port that Dr. James Johnson encountered the malignant fever which committed such dreadful ravages in the English squadron in 1806, and which forms the basis of his invaluable work upon the diseases of tropical climates. As we were consequently not without the most dreadful forebodings, we adopted every precautionary means of prevention that had heretofore been found useful. Awnings were spread over the ship day and night,—native Javanese boats' crews were employed to do the necessary boat-duties of the ship,—the men were carefully sheltered from the sun; in a word, all unnecessary duty was avoided. Those officers who visited the shores, spent as little time as possible in the city. They went directly into the country, where a purer atmosphere prevails, and they strictly observed the most rigid temperance.

To Dr. Johnson we were much indebted for many valuable hints on prevention; and after the occurrence of disease, we were enabled at once to pursue a course of treatment, with the result of which we had much occasion to be highly gratified. Indeed, to him we acknowledge professional obligations, which it will ever be out of our power to repay.

There was but little variation in the temperature during our stay at Batavia, and the regular return of the land and sea breeze prevented the heat from becoming oppressive; the mean at noon was 82°. When the land breeze first reached us in the evening, it was charged with the most offensive effluvia from the fens and marshes, which stretch along the shores; and although anchored four miles from the land, this noxious atmosphere was so oppressive, that all on board complained much of it. This malaria doubtless brings with it the seeds of the diseases from which strangers suffer so much.

The city is situated in 6° of south latitude, and is intersected by dykes

and canals, to which the Dutch settlers are so partial, and which materially contributed to its insalubrity. The walls which formerly surrounded the town were removed, when in possession of Great Britain, by Sir Stamford Raffles; and the city, at the same time, was extended to the higher and more healthy grounds beyond, where at present the foreign merchants and residents are congregated. The governor and Dutch troops are stationed in the interior, where the climate is less noxious to strangers; but a few years' residence in Java is sure to be followed by physical and mental enervation.

Notwithstanding our precautions, the number of sick daily increased, those reporting themselves sick suffering from a severe form of dysentery accompanied with much inflammation, tormina, and tenesmus. In several cases, the disease assumed a most malignant character from the commencement; and in one case, a robust, vigorous, young man, it terminated fatally within twenty-four hours from the time of its accession. Copious blood-letting, local and general, was ordered in the commencement, and emetics administered to counteract the great tendency to visceral congestion, and to restore a healthy action to the deranged functions of the skin and liver. Mercurials in combination with opium and ipecacuanha were regularly administered, and frequently with the most favorable results; and in conjunction with this, mercurial inunctions were used, to accelerate the action of the mercury; and when ptyalism occurred, the patient in almost every instance was relieved, notwithstanding it did not in every case prevent a fatal termination. When this course of treatment did not arrest the progress of the disease within a few days, bloody foetid evacuations followed, with gangrene, collapse, and death.

On the 10th of April, in consequence of the increase of sickness, we sailed from Batavia with forty-two cases of dysentery on board. On the 20th, we crossed the equator, the thermometer being at 90° , and the sick report increasing. On the 21st, at meridian, at anchor one mile north of the equator, the weather calm, and the thermometer at 85° , fifty cases of dysentery were on the report, and new cases occurring daily. Chloride of lime was used freely about the cots and hammocks of the sick, and every possible attention was paid to cleanliness. On the 1st of May, three deaths occurred within the preceding twenty-four hours; but the number of cases was reduced to thirty-four, and no new ones had appeared within several days. Since leaving port the thermometer averaged 84° , with calm and light airs. After being at sea twenty days, we had sailed but six hundred miles, with a vertical sun, being, indeed, almost directly under the equator. On the previous night, we experienced the most tremendous thunder, lightning, and rain, without wind; and on the following morning, we had a light breeze which continued until our arrival at Canton, after a passage of thirty-nine days. From this time, the health of the crew continued to improve. One hundred and fifty cases of dysentery were registered within a few weeks, among which there occurred but thirteen deaths,—a proportion truly small, when compared with the number of fatal cases on board other ships in the China seas.

The Potomac remained at the Island of Lintin for nineteen days; the mean temperature at noon was 80° , with a fresh sea breeze which thoroughly ventilated the ship. The average number on the sick report was twenty-six, three-fourths of whom had chronic dysentery, and six

suffered from bilious fever. The Lintin fleet, which remains at anchor here for many months at a time, usually enjoys good health; but dysentery and fever, during some seasons, prove very fatal. Although the native Chinese appear to suffer but little from the epidemic diseases, yet they are but a feeble and enervated race. We were informed by a resident American surgeon, that he had frequently met with cases among the natives, in which fractures would not unite; and ulcerations are also extremely difficult to heal, in consequence of this debilitated state of the vital powers.

Ships going to the East Indies cannot be too careful in enforcing the regulations adopted on board the Potomac; for, we were thereby enabled to carry a larger number of men in safety through those seas, than had probably ever before been accomplished. The less animal food consumed, the better; and the entire abolition of the spirituous portion of the ration, would, we are satisfied, be also attended with much benefit in these excessively hot climes.

We sailed for the Sandwich Islands on the 5th of June, with thick heavy weather, and a fresh breeze. On the ninth, during a typhon, with the thermometer at 80° , there were two deaths from chronic dysentery. The easting was made between the 34th and 36th degrees of north latitude, with strong westerly winds and cool wet weather, which completely changed the character of the diseases on board. Pleuritis, intermittents, and inflammatory affections, took the place of dysentery; but they were not of an aggravated character. Twenty-five was the average on the sick report for the passage.

We arrived at Oahu, Sandwich Islands, on the 23d July, after a passage of forty-eight days; and here we remained for twenty-three days. During this period, the mean of the thermometer at noon was at 78° , and that of the barometer 29.90 in. The crew were here granted liberty—"a run on shore,"—which was much enjoyed; and it was followed by a much smaller increase in the number of sick, than generally ensues from liberty in a port which has greater facilities for dissipation and intemperance. On the day of entering the port, seventeen were under medical treatment, and at the time of sailing, twenty-two, which is a very small number in view of the largeness of the crew.

The Sandwich Islands are situated in 20° north latitude. The climate appears peculiarly favorable to the human constitution; for the natives are extremely large and corpulent, and such as are accustomed to labor, are possessed of great strength. This tendency to corpulency is much encouraged, particularly in females, in whom it is considered the greatest evidence of beauty; and to this result, their native food, the *aurum maculatum*, or wake robin, is said to contribute in an especial manner. This plant, which is cultivated with care, contains a large portion of fecula, from which they manufacture starch, made into *poye*, which, eaten with *raw fish*, is considered one of their greatest luxuries. The natives suffer much from a species of leprosy, which they call the *craw-craws*; and to cure which, they undergo a course of treatment with the *kavaroot*,—a powerful alterative and narcotic. Upon the arrival of the missionaries, infanticide was of very frequent occurrence. To effect this purpose, they used a drastic, purgative, indigenous bean, which not unfrequently destroyed the mother, and seldom failed to produce abortion; but this horrid practice, through the salutary influence of the missionaries, has been in a great measure discontinued.

We sailed for the Society Islands on the 15th of August, and crossed the equator on the 5th of September, in 5° west longitude, with the thermometer at 80° , and the south-east trades. At this time there were twenty-four on the sick report. Twelve cases of intermittent fever were admitted during the passage; and many of those laboring under dysentery continued to suffer upon our approach to the equator, from chronic diarrhea. A few degrees north of the equator we met with calms and heavy rains, with the thermometer ranging above 80° , when these cases of relapse occurred. On the twenty-eighth day we anchored at the Island of Otaheite, having an average of twenty-seven under treatment for the time at sea. At this island the crew were much on shore, wooding and watering ship, the tropical fruits were procured in the greatest abundance, and no unpleasant consequences resulted from their use. We lost one of the crew while in this port, from concealed strangulated hernia. This island, which is in latitude 16° south, consists in its interior of high volcanic mountain land, surrounded by a fertile belt of rich alluvial deposit near the shores. The climate is truly delightful, and all the wants of the natives are supplied by the spontaneous productions of nature. The natives have not so great a stature as those of the Sandwich Islands; but they are more gay and cheerful in their character, and many of the females are delicate and graceful. A light complexion is much esteemed among them, to improve which they avoid the sun, and bathe themselves with the juice of the *papa*, which is an indigenous plant. Their diet consists of fresh vegetables, fruit, and fish, of which the bread-fruit constitutes the principal; and as all the tropical fruits are here produced spontaneously, labor is unnecessary, and their lives are consequently inactive and indolent. The Missionaries who remain some time in the Society Islands, seldom escape an attack of elephantiasis. We met with two who suffered from this disease in a most aggravated form. The natives also suffer much from this affliction.

The passage between Otaheite and Valparaiso in Chili was made in the vicinity of the thirty-fifth degree of south latitude; and as it was in the winter of the southern hemisphere, much colder weather was encountered than we had previously met with, accompanied with rain, wind, and a rough sea. The ship was exceedingly uncomfortable, and the change of weather once more completely revolutionized the type of disease. Fifteen cases of pneumonia and pleuritis, with twenty-two cases of rheumatism, were admitted upon the sick report. Milder forms of catarrh and inflamed tonsils were numerous, and the general liability of the crew to indisposition, upon exposure and bad weather, indicated that all began to suffer from the long period passed at sea. After a passage of thirty-four days, we arrived at Valparaiso, having had an average of thirty-six patients, who required careful treatment during the voyage. Besides, many had been excused from duty, from time to time, in consequence of slight indisposition, but who were not placed on the sick report. Among the number sick on this passage were two cases of scurvy, which did not manifest themselves until we came under the influence of the land air. The first few days in port aggravated the disease, but as the symptoms were mild, the patients speedily recovered; and these were the only cases of scurvy which presented themselves during the cruise. The Potomac arrived at Valparaiso, which is in the same longitude with New York, on the

twenty-fourth of October, 1832, having been fourteen months from the United States, nearly twelve of which had been passed at sea.

Soon after arriving, liberty was given to the crew, which, as usual, for a few days, more than doubled the number on the sick report. Eleven were treated for mania a potu, and many contracted syphilis. We remained forty days in port, during which time the crew were freely supplied with fresh provisions, and were allowed relaxation after a long period of active service at sea. The mean of the thermometer at noon was 66° and that of the barometer 29.75 in. This is here the season of spring; high winds prevail from the south, without rain. The number sick averaged nearly forty for each day in port, a majority of them suffering from the effects of the cruise on shore, and the consequent dissipation.

Valparaiso, which is in 33° south latitude, is surrounded by spurs of the Andes, which run down in bold bluffs to the sea. The climate is one of the most salubrious in the world; and to the early Spanish conquerors, who reached it after their invasion of Mexico and Peru, where they suffered much from the intense heat and arid soil, this port was so enchanting that it received the name of the "vale of Paradise." Santiago, the capital of Chili, is ninety miles inland, at the foot of the Cordillera, with a population of nearly fifty thousand. The capital is remarkable for sudden vicissitudes of temperature, the days being very hot, while the nights are cold. This is occasioned by the snow-clad mountains near the city, the cold atmosphere from their summits descending into the highly rarefied atmosphere of the plains below. Remittent and intermittent fevers are very common, as well as rheumatism, and the whole class of phlegmasiæ, which invariably result from extremes of heat and cold. Goitre is frequently met with, every individual in some families being affected with it,—a disease which the natives, as in Switzerland, attribute to the use of the snow-water from the mountains, which supplies the town; but this explanation would surely be laughed at by the patients affected similarly, that we saw in the island of Sumatra. The various preparations of iodine have been found very efficacious in its treatment. While at Santiago we heard of a case of extirpation of the thyroid gland, which resulted in the death of the patient.

On the second of December we sailed for Lima, with the usual south wind, and arrived at Callao on the fifteenth, the sick report having been reduced to eighteen. We remained in this port for seventy-five days, during which period the ship's hold was broken out, and every part thoroughly cleaned and painted. The weather was uniformly clear, with a most delightful south wind; here it never rains, and at this season, mists and fogs are equally unknown; the mean of the thermometer at noon was 70° , and that of the barometer 29.85 in., with a daily proportion of twenty-four upon the sick report. Four cases of remitting fever were treated; there was but little arterial excitement, with much disturbance of the nervous system, and it was found that they would not bear the use of the lancet.

The city of Lima, which is in 12° south latitude, is eight miles from the bay. The inhabitants, although much enervated by the continued high temperature, and their dissipated and indolent lives, leading to premature old age, yet enjoy good, if not robust, health. Although foreigners suffer less from acute diseases than in India, yet they are insidiously worn down by the climate, notwithstanding the most extreme

temperance and regularity in living. The streets of Lima are kept very clean, many having streams of water running through them; and to this must be added, as an additional cause of their exemption from malignant disease, the remarkable property of the atmosphere in producing dry putrefaction, which thus prevents all noxious effluvia. Dead animals are suffered to remain in the roads; and the Pantheon, in which all the dead of the city are interred, notwithstanding open to the air, never emits the least disagreeable effluvia. This property of the atmosphere arises from the large quantity of nitrate of soda diffused through it, from the soil, and which in situations that have not been disturbed for a long period, may be found deposited in small crystals. The long chain of the Andes, which forms the immense barrier along the entire western coast of South America, with an elevation of from twelve to eighteen thousand feet, completely interrupts the progress of the winds from the east, the only direction from which they blow along the coast of Peru, being from the south; and as these south winds are much colder than the air they encounter in their progress towards the equator, and as their capacity for humidity consequently continues to increase, it follows that rain cannot form. Rain is consequently unknown in these countries; but as the winds reach the Isthmus of Darien, the air becomes surcharged with moisture, which is there precipitated in torrents.

Our ships of war pass much time in this port, with generally a large sick report. Dysentery sometimes prevails to a great extent, and during the months of July and August, when fogs prevail, those predisposed to tubercular phthisis are liable to have the disease developed. We here lost one of the crew from consumption; and an officer from the U. S. Ship Falmouth, who was seized with hæmoptysis, was transferred to the Potomac, in the hope that a change to Valparaiso would be of service; but the case terminated fatally soon after our return to Chili.

On the twenty-eighth of February, 1833, we sailed for Valparaiso, which we reached in sixteen days, after a cold, wet, and boisterous passage; the mean of the thermometer was 64° , and the average number on the sick list was twenty-three. We remained in port sixty-seven days, during the months of March, April, and May, (these being the autumn months in Chili), with much colder weather than at the time of our previous visit. In May we had two severe northerns, which, as the harbor is open to the north, are dangerous; and both were accompanied with rain. These northerns, which are always indicated by the barometer, only occur at this season. The average on the sick report during our stay, was twenty-one; and this number was kept up in consequence of the liberty given to the crew on shore. Several cases of pleuritis, rheumatism, and inguinal adenitis, occurred in consequence of the exposure and the wet ship. At Lima, cases of chronic diarrhœa presented themselves, which were relieved soon after a change to a cooler climate.

On the twenty-fifth of April, a case of small-pox occurred in one of the servants, who contracted the disease on shore. As soon as the character of the affection was ascertained, the patient was transferred to an hospital on shore, to prevent its extension. Within a few days, another case made its appearance, and this was followed by a third, all of whom were sent on shore. On the first of May, during a norther, the thermometer fell to 40° , there being now a large sick list, composed

chiefly of inflammatory affections. During our stay, fourteen were upon the report with scrofulous affections, twenty-two with pulmonary and hepatic inflammation, and sixteen with rheumatism. Four weeks having elapsed since the appearance of the last case of variola, it was thought that the disease had disappeared, and we consequently, on the twenty-second of May, sailed for Coquimbo, which we reached in three days; but on the eleventh of June other cases of variola presented themselves, which placed beyond a doubt the fact that the contagion was on board ship, and that it would inevitably extend throughout the entire ship's company. It was now determined to inoculate the whole ship's company, as we would thereby materially diminish the severity of the disease, and accelerate its progress throughout the ship; for, as long as it continued on board, we were subject to a most irksome quarantine. On the twentieth, all hands were called to muster; and beginning with the officers, every individual who was not marked with the small-pox was inoculated with lymph taken from a well-developed case on board. The number inoculated was two hundred and eighty-seven, all of whom had their grog stopped, and were daily furnished with fresh provisions. At this time the general health of the crew was very good, having an average of but eighteen on the report, exclusive of those suffering from small-pox.

Eighty-five of those inoculated took the disease, many of them having it in a very mild form. When there was a tendency to inflammation, or the febrile action ran high, venesection was ordered with small and repeated doses of the sulphur magnesiae. The solution of supertart. potassae was given as a common drink, and a low diet prescribed. In eleven cases, the eruption extended over the body; but in no case did it become confluent, nor was it accompanied by any unfavorable symptoms. The febrile excitement was most severe on the eleventh day after inoculation, from which time it gradually subsided. Thirteen of the crew were without any evidence of previous vaccination, all of whom took the disease from inoculation; and the eighty-five who became effected in this way, were consequently all susceptible to its influence.

While here in quarantine from small-pox, the American whale-ship "Corinthian," entered the port with this disease on board. There were three cases, two of which terminated fatally soon after her arrival. The remainder, twenty-seven, we inoculated, eleven of whom took the infection and recovered in proper time, without any unfavorable event. Of the three who took the disease in the natural way, two died, while eleven with the disease by inoculation, all recovered,—a result which presents strong testimony in favor of inoculation.

Coquimbo is very healthy, and it has a remarkable uniformity of temperature throughout the year. The city, eight miles from the landing, was called, by the old Spaniards, from the serenity of its atmosphere, La Serena, and it was selected, for the same reason, by the proprietors of the silver and copper mines, as their residence. To this purity of the atmosphere and uniformity of temperature, together with the careful inoculation of all on board, may be attributed the good fortune of not losing a man out of so large a crew, from this terrible disease. The average on the report, exclusive of the cases of variola, was nineteen; the thermometer averaged 69° , and the barometer 29.80 in. There had been no rain at Coquimbo for three years previous to our arrival, but while there we had several showers.

The cases of small-pox had so far improved by the eighth of July, that the Commodore was enabled to put to sea, with the usual south wind, which in eight days carried us to Callao. On the twenty-second of August we sailed from Callao, having passed thirty-five days in port; and during this time, the thermometer at noon averaged 71° , the barometer 29.77 in., and the daily ratio of the crew under medical treatment was twenty-eight.

This period is here the midst of the season of fogs and mist, when the atmosphere is continually obscured; and now is the time when the prevailing diseases of dysentery, fevers, and pulmonary affections, are rife. Several of the crew were down with remitting fever, which was insidious in its approach, accompanied with great prostration and a small and frequent pulse. Dr. Ruschenberger, the surgeon of the Falmouth, who had seen much of this disease on this coast, found the best treatment to consist in mild saline diaphoreties and regimen. Many of the crew suffered from an enlargement of the inguinal glands, which appears peculiar to the coast of South America, and in which suppuration, notwithstanding every care and attention, will follow. These cases of adenitis are unconnected with syphilis, and are extremely difficult of treatment on board ship. In three days we anchored at Payta; and here, although so short a distance from Callao, where we had recently been enveloped in fogs and mists, we found the atmosphere perfectly serene, with but little difference in the thermometer between day and night.

After a short stay, we sailed for the Gallapagos Islands; and on the first of September we anchored in Essex Bay, Charles Island, $1^{\circ} 13'$ south latitude. This entire group of islands is of recent volcanic origin, one or more cones of craters being found on every one; and as regards soil, little has as yet accumulated to sustain the scanty vegetation. Until recently these islands have been uninhabited, the one at which we were anchored having a few people. The crew were much on shore, collecting the immense terrapins, for which these islands are celebrated; and notwithstanding the great labor of carrying these large animals over the broken lava, under a vertical sun, they remained in good health. It was in this port that Commodore Porter recruited his men, and procured fresh provisions during his cruise in the Essex in the last war. American whale-ships resort much to these islands for the same purpose, an additional inducement being found in the circumstance that the sailors are here unable to procure ardent spirits, and there is no danger of desertion. During the ten days that we remained in port, the mean of the thermometer was 73° , that of the barometer 29.90 in., and the average on the sick report, including several cases of dysentery, was twenty-one. All those here attacked with dysentery, had suffered from the same disease when at Batavia, the antipodes from our present position.

From the Gallapagos Islands we proceeded to Guayaquil, anchoring on the eighth day, at Puna, at the mouth of the river, in 2° south latitude. The crew were much predisposed to disease of the intestinal canal, particularly those who had previously suffered in the East. The number of cases of dysentery continued to increase, with acute inflammatory symptoms, tormina and bloody evacuations; but the disease did not assume that malignant type, nor was it so difficult of treatment as that of Batavia. Among thirty-eight cases of dysentery

and diarrhoea treated since our arrival in the vicinity of the equator, but two terminated fatally. Within the month, when in the same latitudes, eight cases of chronic hepatitis came upon the sick report, which yielded to mercurial alteratives, and the nitro-muriatic acid administered internally and by baths. While at Puna, the average on the report was thirty-two, a majority of whom were seriously unwell, and required much careful attention. Guayaquil is at all times very unhealthy, particularly during the rainy season, which continues several months. The quantity of rain that falls is very great; but as we could not ascertain that any rain-gauge had been kept, we are unable to give the quantity.

On the 28th of September we sailed for Payta, which was reached in three days, having now twenty-eight upon the sick report. A few days in this truly delightful atmosphere again reduced the number of sick to fifteen, which consisted of the convalescents with dysentery and diarrhoea. The climate of this port is one of the most salubrious on the coast of Peru, it being remarkable for uniformity of temperature, dryness of the atmosphere, and the regularity of the winds. The mean annual temperature is about 72° , and the mean of the barometer is 29.90 in.; and here the dense fogs of Lima, and the heavy rains of Guayaquil, are equally unknown. Payta is the port of Piura, a city with a population of four thousand, twenty miles inland on the Colon river. This river passes through marshes filled with the *sarsaparilla*, from which the waters are imputed to imbibe medicinal virtues, which, together with the salubrity of the atmosphere, makes this place the resort of invalids from the neighboring country. The *sarsaparilla* forms an important article of exportation.

The cruising grounds for the American ships employed in the sperm whale fisheries are directly off this port; and they frequently resort here for supplies, particularly for fruits and vegetables, as antiscorbutics, for which, in their long cruises, they are much in need. At the head of the list of antiscorbutics, among the whalers, stand raw potatoes; two are served out daily to each man, and eaten raw with vinegar, which, after a long confinement to salt provisions, are much relished by all hands. Those only who have been much at sea can know the longings for, and the luxury of, fresh vegetables of any description.

October 10th, we sailed for Lambayeque, where we touched on the 16th, and proceeded thence to Callao, which we reached on the 27th of the month. In our progress south the thermometer fell, and we again encountered the fogs and mists, which, for a time, we had left behind. At the period of our arrival, the sick report was increased to forty, the mean of the thermometer at noon, for the passage, being 62° . We remained twenty-seven days at Callao, the thermometer having a mean of 69° , and the barometer of 29.65 in., with an average of thirty upon the sick report, including several cases of scrofulous glandular affections, which are here found to be very obstinate.

On the 21st of November, we sailed from Callao, having at different periods of the cruise, spent one hundred and twenty-seven days in this port. The average number under treatment was larger here than at Valparaiso, consisting of cases of disease of the intestinal canal, and the obstinate cases of adenitis to which we have already alluded. In a few cases, where constant rest could be maintained, the use of the pediluvium and evaporating lotions, would effect a resolution; but these cases were rare; suppuration usually ensued, when for weeks and months we had

to contend with indolent ulcers. The average number sick in this port during our visits at various seasons, was thirty-two.

The Limaians, the descendants of the Spanish conquerors, are rapidly decreasing, and promise, in their continued revolutions, soon to become extinct. They have uniformly lived in great luxury, as the proprietors of the valuable gold and silver mines; and for generations, they have been devoted to gambling and dissipation, which have rendered the present race short-lived and feeble. They are diminutive in stature, slight in form, and many of the females, when young, are exceedingly beautiful; but from the premature development of a warm climate,—a law which recent investigations show to have been much exaggerated,—they often become mothers at an early period, and consequently rapidly decline into premature old age. The native Peruvians, who at this time constitute seven-eighths of the population of the country, are short, with very large chests, and broad Chinese features; they are fond of agricultural pursuits; and as they were originally conquered by a mere handful of Spaniards, they still permit themselves to be governed by the same.

We would here respectfully, as a traveller, insert our protest against the declaration of our learned and distinguished countryman, Dr. S. G. Morton, who, in his elaborate volume upon the Crania of America, speaks thus:—"The concurrent testimony of all travellers goes to prove, that the native Americans are possessed of certain physical traits that serve to identify them in all localities, the most remote from each other, nor do they, as a general rule, assimilate less in their moral character and usages." In craniological formation, as well as in his moral character and usages, the Peruvian differs widely from his warlike and intellectual neighbor of North America. The physiognomy is entirely different, possessing but little intelligence, and being totally devoid of the noble intellectual expression of our northern Indians. Temple, who passed years among them, says that they resemble the Tartar or Chinese; and Burrow, who has written so ably upon their country, expresses his conviction of their descent from the Chinese; and as regards the native Mexicans, many of the most accurate observers, —as for instance, in the recent able work of Madame Calderon de la Barca,—advance the same opinion respecting their origin. Between this nation and the Peruvian, there is a close approximation in physical formation; and as regards habits and character, they are found precisely to correspond. The phrenological organization of the native Peruvian indicates but little intellectual development, while at the same time their animal propensities are also diminutive; and these indications are strongly corroborated by their habits and character. When left to themselves, unlike our northern Indians, they diligently cultivate their fields, live amicably with each other, and are hospitable and friendly. The striking analogy among the four hundred dialects of America, it is true, strongly confirms the opinion of a common origin, pertaining to all the American tribes; and all the differences found to obtain among them, may possibly be due entirely to the agency of climate and other causes. But these differences, physical, moral, and intellectual, are certainly much more strongly marked than the language of Morton, just quoted, would at all justify.

We arrived at Valparaiso in twenty-five days, having encountered calms and adverse winds, with an average of twenty-six under

treatment, for the passage. Off the island of Juan Fernandez we encountered a gale, with the thermometer at 50° , which brought on several cases of pneumonia and pleuritis. Six cases of hepatitis were treated at sea; and as we approached the coast, the cold air from the snow-clad Andes brought on catarrhs and colds, from which few escaped. A few days in port restored the crew to health, as the weather at this season is dry and temperate.

We remained fifty-three days in Valparaiso, with an average of eighteen on the sick list, a majority being cases of slight injuries; but there were several cases of bilious fever, which did not, however, present any important features. A quarter gunner, one of the most athletic and valuable men in the ship, lost his life from a fall on shore, causing a fracture of one of the lumber vertebræ, and one case of phthisis pulmonalis terminated fatally.

At this season, (the summer,) dysentery and fevers prevail among the natives on shore, and acute cases of hepatitis also manifest themselves during the warm weather. We were called in consultation in a case of hepatitis in a Mr. Blanco, a gentleman who, educated at West Point, promised much usefulness in this new country; but several previous attacks had much enfeebled him, and suppuration taking place in the liver, he died within a short time after our first visit. The total number of days passed at Valparaiso at our different visits was one hundred and sixty, with a uniformly small sick list, notwithstanding the crew were allowed to go on shore frequently during each visit,—an immunity from disease which must be due to their incomparable climate.

The native Chilanoes are a robust and vigorous race, frequently attaining a great age. Accustomed from youth to the open air, with much active exercise, particularly on horseback, they are capable of enduring great fatigue; and nowhere are men met with, who are possessed of more iron constitutions than the inhabitants of these mountains. An inflammatory fever prevails during the autumn, in the interior, attended with much cerebral congestion, which sometimes assumes the form of a fatal epidemic. By the natives it is thought to be contagious, who give it the name of *chavolungo*, for which they administer an infusion of an indigenous plant, the *conchelagua*, a powerful diaphoretic. The condition of the medical profession, in both Chili and Peru, is very low, there being no schools of medicine. The native practitioners are from the lower orders of life, ignorant and uneducated, and commanding but little respect. In the large cities, a few foreign medical men are to be found, but their practice is limited to foreigners and a few of the most affluent of the natives, the prejudices of the lower classes being much against them.

On the 9th of February, we sailed for the United States; and we encountered head winds until we reached the fiftieth degree of south latitude, the thermometer falling as we advanced south, with much rain. On the 6th of March we were off Cape Horn, in 57° south, with the thermometer at 44° , and the barometer at 29.80 in., and thirty-six being upon the sick report. The character of the diseases on board had entirely changed since our departure from Valparaiso. Cases of pleuritis, cynanche tonsilaris, and rheumatism, augmented the sick report; and very many of the crew were very unwell, but unwilling to go upon the sick list, as long as they were able to keep about on our

passage home. After doubling Cape Horn, fresh and favorable winds continued until our arrival at Rio de Janeiro, on the twenty-third of March. The average on the report of sick for the passage, was thirty-three, three-fourths of whom suffered from inflammatory affections, produced by the cold weather off the cape; and a proportion daily of as many more were prescribed for, who still continued to perform their duty.

We remained sixteen days in Rio. Although this was the rainy season, with frequent showers during the day, yet the quantity of rain which fell was very small. The mean of the thermometer was 78°, that of the barometer 29.78 in., with twenty-one on the sick report.

After leaving Rio, a number of cases of diarrhoea were admitted for treatment, being no doubt the result of the heat and rain to which the men had been exposed in watering ship and bringing off the supplies. On the 27th of April we crossed the equator with the thermometer at 82°, with southeast trades, and twenty-seven on the sick report. We reached Boston on the twenty-third of May, after a passage of forty-four days, having had a daily average of twenty-eight sick. Upon our arrival in the United States, the health of the crew was such as to enable all but six to take their discharge. Of these, two had phthisis, one, a fracture of the leg, and the remaining three, chronic rheumatism; all of whom were transferred to the naval hospital.

Having thus concluded the statistical details of this voyage, which, it is to be feared, have proved somewhat tedious, the deductions that follow cannot, however, but be regarded as of the highest interest and importance.

The Potomac had been in commission for more than three years, during which period the total number of deaths had been twenty-five, viz :

Dysentery,	-	-	-	-	16
Phthisis,	-	-	-	-	3
Hepatitis,	-	-	-	-	1
Concealed Hernia,	-	-	-	-	1
Hydrocephalus,	-	-	-	-	1
Fractured vertebrae,	-	-	-	-	1
Shot at Quallah Battoo,	-	-	-	-	2
					—
					Total, 25

Seven of the ship's company, including two of the junior officers, had been returned to the United States as invalids.

The average number of souls on board for three years was four hundred and ninety, including thirty commissioned and warrant officers. The annual ratio of deaths was therefore 2.08 per cent., which is much less than in the same number of adults on shore. It should be remembered, however, that at the time of sailing we were all in excellent health. The daily average of the number on the sick report for three years, was twenty-eight, which is surely a very small number out of a crew of five hundred, who had gone through the East Indies, and crossed the equator six times. Moreover, this was the first cruise of this ship, when, in consequence of the large quantities of salt used in their construction for the preservation of the timber, crews often suffer

much from the humidity occasioned by the salt, which does not exist in her subsequent service. The United States Frigate Brandywine was very sickly on her first two cruises, which was attributed to her being freely salted,—an inference strengthened by the fact that since then her crews have enjoyed good health.

This frigate, as an experiment in our marine, had her galley on the berth-deck, where it was thought the heat from the fires would assist in the ventilation of the ship, at the same time that she would be kept dry between decks. There were unquestionably constant currents of air down the hatches and windsails toward the fire, at the same time that the highly rarefied air from below ascended; but this was more than counteracted by the suffocating heat of the large fires on the confined and crowded berth-deck, while the water constantly and necessarily in use in cooking, kept the lower deck wet. Besides, when the galley is placed there, cleanliness cannot be so well preserved, as when it is on the upper deck.

During the voyage of circumnavigation, the Potomac sailed over sixty-one thousand miles, having been at sea five hundred and fourteen days. She crossed the equator six times, varying from 40° north, to 57° south latitude; and in all this service, she had not a spar carried away, nor did she lose a man by any accident on board,—the strongest testimony of the excellent state of discipline, and the prudence and precaution of her commander.

In the cheerful and contented condition of the crew, with constant employment, can be traced the health of the whole ship's company; and to this end, theatrical entertainments, a weekly newspaper when at sea, and a relaxation from the severe military discipline during the long passage across the Indian and Pacific Oceans, as well as the judicious medical police enforced on board while in the most insalubrious ports on the globe,—all materially contributed. About one-third of the crew had the spirituous portion of the ration stopped for the cruise; but as that number embraced the boys and landsmen, who had never been at sea, they were more frequently on the sick list than the old seamen who drank their grog. The recent reduction in the quantity of grog, as well as the change in the ration, is probably the most important step yet taken toward the reformation and improvement of the character of the seamen and of the whole navy.

When we compare the health of the crew of the Potomac with that of early circumnavigators, the increased health of ships' companies at sea will be found truly surprising. Lord Anson sailed from England with eight vessels and one thousand nine hundred and eighty souls; and out of these, only a single ship's company, the Centurion, performed her voyage of circumnavigation. The early Spanish and Dutch navigators were equally unfortunate, and whole crews perished from the scurvy,—a disease which has been almost exterminated in modern days.

The great improvements in marine police, first adopted by Captain Cook during his voyages of discovery, among which was the introduction of the hammock for all on board, have benefited navigators as much as his geographical discoveries; but his vessels were small, which are always more healthy than large ones; his crews, at the same time, were in a constant state of excitement, anxiously looking forward toward the discoveries which they were constantly making; and they were also satisfied that they would receive a handsome reward and a

warm reception, upon their return home. These precautions, in conjunction with cheerfulness and cleanliness, constitute the only good prophylactics on board ship.

One word more in regard to scorbustus. This horrible disease may be said to have been the universal scourge of the sea until the year 1795, when the British admiralty issued an order for furnishing the navy with a regular supply of lemon-juice, from which time the extinction of this horrid disease in that arm of the service may be dated. The destructive ravages of this disorder are awfully portrayed in the narratives of the early English navigators, particularly in those of Sir Francis Drake, Davis, and Cavendish. Lord Anson, in the course of his voyage around the world, lost more than four-fifths of his men; and it is mentioned by Sir Richard Hawkins, that within his own naval experience, he had known more than ten thousand men perishing by the scurvy. Prior to the year 1796, more sailors, it is believed, fell victims to this terrific scourge, than to the united consequences of naval warfare and the various accidents incidental to a maritime life. These results, compared with the medical statistics of the Potomac's circumnavigation of the globe, we deem alone of sufficient importance in their deductions, to reward us for our present labor.

